3.21 HISTORIC, CULTURAL, AND ARCHAEOLOGICAL RESOURCES

3.21.1 Studies and Coordination

A cultural resources analysis was conducted to evaluate the effects of each alternative (at a programmatic level) on prehistoric and historic properties and potential historic properties.

The cultural resources analysis included a review of:

- Archaeological sites (known and recorded prehistoric and historic)
- Archaeological (prehistoric) high probability areas (modeled from literature, maps, and other sources, without conducting actual archaeological field surveys)
- Buildings and structures (historic built environment)
- Traditional cultural properties (TCPs)
- Properties listed in, or determined eligible for listing in, the Washington Register of Historic Places and/or the National Register of Historic Places
- Properties that may be eligible for listing in the Washington Register of Historic Places and/or the National Register of Historic Places
- Potential effects of the project alternatives on historic properties or potential historic properties in or near the area of potential effects of the project alternatives

The specific data measures and data sources were:

- National Register of Historic Places on file at the Washington State Office of Archaeology and Historic Preservation (OAHP)
- National Register of Historic Places (NRHP) Evaluation Criteria A-D, Section 106 of the National Historic Preservation Act (NHPA)
- Washington Register of Historical Places (WRHP) (on file at OAHP)
- Determinations of Eligibility (on file at OAHP)
- Archaeological site inventory files (on file at OAHP)
- Traditional Cultural Property files (some on file at OAHP but most are in confidential Tribal archives)
- Inventory forms on file with the King County Historic Preservation Program
- Lists of heritage resources on file with local jurisdictions (cities, counties) and historical societies
- Tribal input on TCPs. Meetings have been conducted with the federally recognized Muckleshoot Tribe. The federally recognized Snoqualmie Tribe and Yakama Indian Nation have been contacted, as have been the Duwamish Tribe and Kikiallus Tribe, which are not federally recognized.
- GIS mapping of historic built environment based on tax assessors' offices in coordination with David Evans and Associates, Inc. City and/or county tax assessors in each jurisdiction were contacted to provide data or maps illustrating tax lots with standing buildings/structures

whose construction dates are 1960 or earlier. The data output and maps were organized by decade time blocks (pre-1900, 1900-1910, etc.).

The cultural resources impacts evaluation was conducted using information supplied by federal, state, and local agencies. Representatives were contacted, interviews were conducted, and information (including reports) was obtained from these agencies. The following agencies were contacted:

- Archaeological site and archaeological probability area modeling consultation: Dr. Robert Whitlam, State Archaeologist (OAHP)
- Historic resource consultation: Mr. Greg Griffith, Deputy, State Historic Preservation Officer (SHPO) (OAHP)
- Area of Potential Effect (APE) defined by Mr. Kwadwo Fordjour/WSDOT in consultation with Dr. Allyson Brooks, State Historic Preservation Officer (SHPO) (OAHP)
- The cities of Lynnwood, Bothell, Kirkland, Redmond, Bellevue, Renton, Woodinville, Issaquah, Tukwila, Kenmore, Newcastle, Mercer Island, and Kent were contacted to secure lists of locally recognized cultural resource landmarks.

3.21.2 Methodology

In consultation with the Washington SHPO, the I-405 Corridor Program developed an approach to consider cultural resources (archaeological properties, traditional cultural properties, and properties of the historic built environment) at a program level, consistent with the programmatic evaluation in the EIS. Data collection and analyses were preliminary by design, and are not intended to provide a project-level environmental analysis, documentation, and review. Since compliance with Section 106 of the National Historic Preservation Act requires lead federal agencies to take into consideration the effect of a project on properties listed in, or eligible for listing in, the National Register of Historic Places, it was agreed that formal compliance with Section 106 would take place during subsequent project-level environmental analysis, documentation, and review. In the interim, absent any commitment to move forward with the construction of specific transportation facilities, there is not any undertaking that the SHPO must review under the Section 106 process.

Consideration of potential project impacts to cultural resources at this programmatic level of analysis fulfills both the spirit and intent of Section 106 to take into consideration, at the earliest possible time, the potential effects of the proposal on eligible historic properties. Consistent with this approach, WSDOT is currently engaging in government-to-government consultation with federally recognized and non-recognized Native American Tribes to facilitate "early consultation" under the revised Section 106 regulations.

The APE was used to focus data collection efforts within the study area. Collected data (except confidential archaeological and ethnological resource data) were entered into the project geographic information system (GIS) map layers to facilitate comparative analysis between the alternatives. The level of detail and measures to compare cultural resources among the alternatives included:

- Presence (tabulated number) of known/recorded historic properties (number of NRHP, WRHP, local landmark properties)

- Presence (tabulated number) of potential historic properties (number of pre-1960 constructed buildings and structures based on tax assessor maps)
- Presence of archaeological high probability areas
- Presence (tabulated number) of known/recorded archaeological sites
- Presence (tabulated number) of known/recorded TCPs

Federally recognized Tribes that have been contacted by WSDOT are the Muckleshoot, Snoqualmie, and Yakama Indian Nation. The Duwamish Tribe and Kikiallus Tribe, which are not federally recognized, also have been contacted. WSDOT will conduct government-to-government consultations with local Tribes and will encourage the Tribes to provide information as to the location(s) of culturally sensitive areas (TCPs) that should be avoided.

David Evans and Associates, Inc. (DEA) secured tax assessor data from King County and Snohomish County showing the locations of all buildings in the project area constructed prior to 1960. The collected data were organized in accordance with building tax lot plots that were color coded in ten-year build increments: pre-1900, 1900-1910, 1910-1920, etc. These data enabled the cultural resource team to identify older buildings and structures throughout the project area and to tabulate, with some degree of accuracy, raw numbers of tax lots that might hold potentially eligible historic properties. As suggested by the SHPO, a minimum age threshold of 40 years was selected to allow a ten-year "study period" for the I-405 corridor; normally, only buildings 50 years of age or older meet the minimum age threshold to be considered as potential historic properties.

Collected data were entered in the project GIS map layer(s) and then superimposed over the alternatives to facilitate quantitative and qualitative comparison. At this level of analysis, the cultural resource team used their collective best professional judgement to distinguish which alternative is more or less likely to endanger (or "take" or "constructively use") historic properties. In this fashion, the number of potential impacts was compared between alternatives. It should be noted that this programmatic level of analysis does not include formal historic register eligibility evaluation of the historic properties.

No systematic field surveys were undertaken either to identify the presence of archaeological sites or to field-check tax assessor data on pre-1960 constructed buildings and structures. Such systematic field surveys will be conducted in project-level analyses at a later date, as needed.

Archaeological high probability areas were modeled using both existing site location information and review of topographic maps to discern areas of greater likelihood of Native American occupation and use. The high probability areas were superimposed over the project alternatives to facilitate comparative analysis.

The analyses in this section are based on the *I-405 Corridor Program Draft Cultural Resources Expertise Report* (CH2M HILL, 2001), herein incorporated by reference.

3.21.2.1 Historic Properties

For the purposes of this study assumptions were made with regard to historic properties and the potential impacts each alternative might have on them. It was beyond the scope of this investigation to conduct an inventory of every property located within or adjacent to each route of every project element associated with the alternatives. This investigation compares the

potential impacts of each alternative. This was accomplished by making the following assumptions:

- Any building or structure over 50 years old has the *potential* to be NRHP eligible. Most buildings and structures over 50 years of age would probably not be NRHP eligible, but it can be safely said that greater numbers of properties over 50 years of age are likely to hold greater numbers of properties eligible for listing on the NRHP. Thus, by comparing the numbers of buildings 50 years of age or older between each alternative, the *potential* for cultural resource impacts can be compared between alternatives.
- Each project element in each alternative will affect all the properties along its length. Actually, many of the projects will not affect adjacent properties. However, specific impacts to properties are impossible to determine without the specific project-level plans and footprints. It is assumed that specific project-level investigations will be conducted when environmental permitting for actual projects proceeds.

3.21.2.2 Archaeological Properties

Most of the project study area is fully urbanized and very little of it has been subject to archaeological investigation. As with the historic properties above, conducting actual archaeological surveys of every project for each alternative is impracticable. The following assumptions are made in order to compare the *potential* impacts of each alternative:

- Any recorded archaeological site in the project area is eligible for listing in the NRHP.
- Areas adjacent to water courses or lakes are High Probability Areas (HPAs) for archaeological sites. That is, they are areas more likely to contain archaeological remains in comparison to other areas lacking water or water-associated resources important in Native American subsistence economies.

The impact analysis assumes that the identified historic properties and potential historical properties may be subject to possible harm from future I-405 related transportation projects, and, more importantly, it assumes these future projects will involve a federal regulatory nexus (permitting, funding assistance, etc.). When a federal regulatory nexus is present, Section 106 (16 USC 470f) of the NHPA requires federal agencies, prior to implementing an "undertaking" (e.g., issuing a federal permit), to consider the effects of the undertaking on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) and the SHPO a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing on the NRHP.

Under the NHPA, a resource is significant if it meets the NRHP listing criteria at 36 CFR 60.4:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
>
> - that are associated with events that have made a significant contribution to the broad patterns of our history, or
> - that are associated with the lives of persons significant in our past, or
> - that embody the distinctive characteristics of a type, period, or method of construction,

or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or

- that have yielded, or may be likely to yield, information important in prehistory or history.

Impacts commonly associated with construction projects include acquisition of land and improvements, loss of access, and changes in land use in the vicinity. Short-term impacts during construction include temporary impairment of access, increased noise levels, increased dust and emissions, visual obstructions, and disruption of established traffic patterns. Such impacts (or "effects"), in the parlance of the federal regulations, are considered to be harmful to cultural resources (they are "adverse").

The Advisory Council's regulations implementing Section 106 of the National Historic Preservation Act created a process by which federally assisted undertakings are reviewed for their "effect" on properties listed on the NRHP or properties determined to be eligible for listing. The Criteria of Effect and Adverse Effect are applied to determine whether a proposed action could affect the property and whether those effects should be considered adverse. If the undertaking could change in any way the characteristics that qualify the property for inclusion in the NRHP, for better or for worse, it is considered to have an effect. If the undertaking could diminish the integrity of such characteristics, it is considered to have an adverse effect.

Given the extensive geographical area encompassed by the I-405 alternatives, it would be impractical to conduct project-specific cultural resource inventories for each project, and it is not within the scope of this EIS to evaluate impacts for each project. Therefore, this investigation seeks to compare the *potential* cultural resource impacts of each alternative. As stated previously, this was done under the following assumptions:

- All historic properties over 50 years of age are potentially eligible for listing in the NRHP.
- All project facilities adjacent to historic properties over 50 years of age will affect those properties.
- All recorded archaeological sites are eligible for listing in the NRHP.
- All project facilities adjacent to recorded archaeological sites will affect those sites.
- Areas adjacent to water courses or lakes are more likely to contain archaeological sites than other areas.

Predicting the likelihood of I-405 project impacts to archaeological sites in areas largely unsurveyed by professional archaeologists is problematic, particularly with the highly urbanized and developed nature of the study corridor. For this report, it was decided that the most meaningful way to predict potential archaeological sites and impacts to them was by examining U.S. Geological Survey maps to determine which alternatives had the most projects crossing, or lying directly adjacent to, surface water bodies. Because of these limitations, no quantitative analysis is attempted here. Rather, a simple qualitative comparison is made between alternatives.

The five major water bodies in the project study area are a general guide to areas having a higher likelihood of containing buried archaeological sites. Each alternative was examined to develop a list of all intersections with and approaches to these water features. Once the complete list was compiled, the alternatives were compared.

There are numerous creek, stream, and lake crossings within the I-405 project study area, many of which would, with more exhaustive analysis, merit HPA designation.

3.21.3 Affected Environment

This section provides an overview of the major cultural resources in the study corridor, including regional and local cultural resources and the locations of historic properties, potential historic properties, and archaeological high probability areas (whose numbers and/or mapped geographic footprints were used as data measures for the cultural resources evaluation). A detailed discussion of these elements is included in the *I-405 Corridor Program Draft Cultural Resources Expertise Report* (CH2M HILL, 2001).

3.21.3.1 Prehistoric Archaeological Sites and High Probability Areas

The prehistory of Puget Sound is poorly known due to a lack of systematic, broad regional research. Most archaeological research has focused on the edges of Puget Sound and its major tributaries, and the urban areas have received only limited investigation. The I-405 project area is located within the southern Puget Sound archaeological study area (Wessen, 1985). This archaeological study area encompasses all of King County and most of northwestern Washington. Several hundred cultural resource surveys have been conducted within this study area, with most efforts focused in King, Pierce, and Snohomish counties. Hundreds of prehistoric sites have been recorded throughout these counties, including shell middens, lithic scatters (the remains of chipped stone tools and tool manufacturing debris), and wet sites (sites in water-saturated areas). Indian burials have been found in association with some of the shell middens. Archaeological sites within the southern Puget Sound area date between 11,000 and 250 years B.P. (before present) (Wesson, 1985; Thompson and Stilson, 1988).

Only three previously recorded archaeological sites appear to have the potential to be affected by project elements contained within any of the proposed alternatives. In the I-405 corridor, large areas have never been systematically searched, on the ground, for the presence of archaeological sites. Because many large tracts of land are now thoroughly modified from their original historic condition (either through logging, land-clearing and subsequent agricultural use, or mass grading for residential/commercial development), it may never be possible to fully inventory the archaeological resources that were once present (or might still be present). Nevertheless, construction projects in the I-405 project area, and in adjacent areas of Puget Sound, have encountered archaeological sites not otherwise known/recorded prior to their inadvertent discovery.

Archaeologists employ many variables to help them predict where archaeological sites are likely to be found. The most obvious and the most commonly employed predictor is distance to water. Human settlement, even in the lush, wet Pacific Northwest, is restricted to areas where water is available in some quantity. Fresh water is required for drinking and other domestic purposes, while rivers and ocean waters provide important sea mammal, fish, or shellfish resources. In prehistoric Puget Sound, streams, rivers, lakes, and the sound were the main transportation arteries, although some overland trails were used.

Delineation of archaeological high probability areas (HPAs) entails a great deal of educated guesswork. Because little systematic archaeological survey work has been conducted in the I-405 project area, the number of known/recorded archaeological sites is few. In project areas that have been subject to greater levels of professional archaeological survey activity, it is often

possible to "model" or "predict" likely locations for archaeological sites. The main function of modeling archaeological HPAs is to take into consideration those factors or variables that might help predict where archaeological sites might be located so that proper measures can be taken in advance of construction to maximize opportunities to detect and preserve these ever–vanishing, non-renewable cultural resources. Based on what is known from the locations of recorded archaeological sites in the I-405 project area, and in immediate adjacent areas of greater Puget Sound, some reasonable conclusions can be drawn concerning the location of archaeological HPAs.

Since the I-405 study area has no alternatives directly on the Puget Sound, most of the water courses are streams and inland lakes. The simplistic method to predict where archaeological sites might be located in the study area is to examine each project location that crosses or runs adjacent to a stream, river, or lake. By comparing the relative frequency of water course approaches, the relative likelihood of encountering archaeological sites can be compared between alternatives. It is conceded that this is an over-simplified and less than complete method to predict the frequency of archaeological sites. Such variables as soil types, vegetation, elevation, and slope are not considered here; employing all of these variables in a predictive model is beyond the scope of this investigation and would require project-level information not yet developed.

The designated HPAs in the I-405 study corridor include the western shores of Lake Sammamish, the eastern shores of Lake Washington, the shorelines of Mercer Island (which is surrounded by Lake Washington), and the main water courses (Green River, Cedar River, and Sammamish River). These designated HPAs, by virtue of their location, also encompass all of the major protected lake coves, river-lake estuaries (with marsh/wetland habitats), and spawning rivers for lake-locked (non-marine/freshwater) salmonids (such as those exploited in the Sammamish River). HPAs of lesser sensitivity, such as smaller streams and creeks and small inland lakes, cannot be easily screened against the project alternatives within the constraints of the map scales used in this analysis. If nothing else, this analysis probably understates the magnitude of HPAs present in the I-405 project area because these lesser-order water courses cannot be considered here.

3.21.3.2 Regional Ethnography

For several thousand years before the arrival of Euroamerican settlers, Native Americans hunted and fished the Puget Sound area. When Euroamericans arrived, central Puget Sound was home to several native groups – all having ties to the Seattle and Eastside areas through land use and intermarriage. Local Puget Sound Salish tribes included the Snohomish, Snoqualmie, Duwamish, and Sammamish River people who were bound together by common culture and lifeways. The Suquamish, who occupied the west side of Puget Sound, followed a subsistence regime similar to the Duwamish, and both of these groups are closely tied through intermarriage (Haeberlin 1918). Native peoples referred to as Green River (or White River) Indians, along with some Duwamish and others, reside today on the Muckleshoot Indian Reservation near Auburn. These upriver groups lived generally to the southeast of the Duwamish and their culture was more adapted to the riverine environments, but they too procured food from the rich shellfish beds of Elliott Bay (Hart Crowser 1998:K-5).

3.21.4 Impacts

The following sections summarize the impacts of each alternative on cultural resources and mitigation measures that can be implemented to reduce or prevent adverse impacts. If mitigation measures are implemented, the level of impact will probably be reduced below the level of significance.

Table 3.21-1 below lists all the previously inventoried historic properties that are adjacent to the project alternatives. Many of these historic properties are included in local, state, or national historic lists and/or registers. Thus, impacts to these properties are more likely to require mitigation. Table 3.21-2 lists the three previously recorded archaeological sites adjacent to projects associated with an alternative. Table 3.21-3 lists the numbers of buildings over 40 years of age in each alternative. Table 3.21-4 lists potential impacts to archaeological high probability areas (HPAs).

Table 3.21-1: Potential Impacts to Registered Historic Properties

			Alternative					
City	Site	Status[a]	1	2	3	4	No Action	Preferred
Renton	0242; 45-KI-211 Renton Coal Mine Hoist Foundation	SR	x	x	x	x		x
Renton	0360 Renton Substation, Snoqualmie Falls Power Company.	SR	x	x	x	x		x
Tukwila	0355 James Nelsen House	SR	x	x	x	x		x
Bothell	0043 Bothell Lake Forest Park Highway	SR	x	x	x	x		x
Bothell	0103 Justice William White House	NR		x	x	x		x
Woodinville	0039; 45-KI-221H Hollywood School	SR, LM		x	x	x		x
Woodinville	0084 Hollywood Farm/Stimson House	SR, NR, LM		x		x		
Bothell	KC 0037; 45-KI-217H W.A. Hannan Home	SR	x	x	x	x	x	x
Bothell	0241 Elliott Farm	LM			x	x		x
Bothell	0038; 45-KI-216H Beckstrom Log Cabin	SR	x	x	x	x	x	x
Bothell	0040 Bothell Schoolhouse	SR	x	x	x	x	x	x
Bellevue	45-KI-467 Union Hill Road Site			x	x	x		x
Bellevue	45-KI-262H Wilburton RR Bridge Trestle	SR	x	x	x			x
Mercer Is.	45-KI-229H Lacey Murrow Floating Bridge		x	x	x			x
Bothell	45-KI-218H Bothell Lake Forest Park Brick Highway			x	x	x		x
Bothell	45-KI-219H Bothell's First Schoolhouse		x	x	x	x	x	x
Renton	45-KI-285 Rail Road Grade		x	x	x	x		x
Renton	45-KI-209 Renton Fire Station		x	x	x	x		x
Lynnwood	Alderwood Manor	Local		x	x	x		x
Lynnwood	Irwin House	Elig. NR		x	x	x		x
Redmond	Turple House and Barn	Elig. NR	x	x	x	x	x	x
Redmond	Eric E. Olson House	Elig. NR	x	x	x	x	x	x
Redmond	Merrilegs Farm	Elig. NR	x	x	x	x	x	x
Kirkland	Sutthoff House	LM	x	x	x	x	x	x
Kirkland	French House	LM	x	x	x	x	x	x
Kent	L.V. Moll and Clark Grocery	Local		x	x	x		x
Kent	Leroy Titus House	Local		x	x	x		x
Kent	Desmet House	Local		x	x	x		x
Kent	Harmon House	Local		x	x	x		x
Kent	Peter Saar Cemetery	Local		x	x	x		x

[a]SR = State Register; NR = National Register Elig.; NR = eligible for NR; LM = Landmark; Local = Local register

Table 3.21-2: Potential Impacts to Registered Archeological Resources

City	Site	Alternative					
		1	2	3	4	No Action	Preferred
Bellevue	45-KI-467 *Union Hill Road Site*		x	x	x		x
Renton	45-KI-6	x	x	x	x		x
Renton	45-KI-438 *White Lake Site*			x	x		x

Table 3.21-3: Possible Impacts to Potentially Historic Properties

	Alternative					
	1	2	3	4	No Action	Preferred
Total (Pre-1960)	189	284	298	292	96	312
Pre-1930[a]	22	33	36	36	20	52

[a]Included in total.
Note: Numbers derived by tax lot analysis.

Table 3.21-4: Potential Impacts to Archaeological High Probability Areas

Project Intersections Near High Probability Areas	Alternative					
	1	2	3	4	No Action	Preferred
NE Bothell Way paralleling the Sammamish River to Woodinville		x	x	x		x
I-405 crossing of Sammamish River at Woodinville	x	x	x	x		x
SR 202 crossing of Sammamish River at Woodinville	x	x	x	x	x	x
Parallel west side floodplain of Sammamish River to NE Redmond Way	x	x	x	x	x	x
Parallel east side floodplain of Sammamish River to NE Redmond Way			x	x		x
SR 520 crossing of Sammamish River near NE Redmond Way	x	x	x	x		x
Parallel Lake Washington on Lake Washington Blvd.	x	x	x	x	x	x
I-405 parallel to Mercer Slough and Lake Washington	x	x	x	x		x
I-90 crossing of Lake Washington	x	x				
Rainier Ave. Improvement parallel to Cedar River		x	x			x
Logan Ave. Improvement parallel to Cedar River		x	x	x		x
I-405 crossing of Cedar River at Renton	x	x	x	x		x
140th Ave. SE crossing of Cedar River			x	x		x
I-405 crossing of Green River at South Center	x	x	x	x		x
I-5 (SR 599) crossing of Green River at Interurban Ave.		x	x	x		x
Crossing of Sammamish River slightly north of SR520		x	x	x		x
Second crossing of Green River south of I-405 South Center	x	x				
Crossing of Sammamish River at NE 124th Street	x	x	x	x	x	x
Improvement along West Shore of Mercer Slough	x	x	x	x	x	x
Crossing of Sammamish River north of NE 90th Street	x	x	x	x	x	x

Table 3.21-4 includes intersections and near approaches (within ¼ mile) of all the alternative projects to the five main water features: Lake Washington, Lake Sammamish, the Sammamish River, the Cedar River, and the Green River.

It is acknowledged that the levels of significance of the HPA intersections listed in Table 3.21-4 are unequal. For example, a project that runs parallel to a stream has a greater chance of encountering archaeological sites than one that crosses a stream. However, they are treated equally in our analysis. Acreage calculations are not possible at this programmatic level of analysis. While this analysis is not rigorous, it provides a general guide to areas where buried archaeological sites are more likely to be encountered.

3.21.4.1 No Action Alternative

The No Action Alternative has the potential to affect historic properties. However, based on the data summarized in the tables above, the No Action Alternative is the least likely alternative to adversely affect historic properties, or it would probably affect fewer properties than any of the action alternatives. The numbers of properties in each category are dramatically lower than in the action alternatives. No previously recorded archaeological sites appear to be affected by this alternative. This alternative encroaches on 6 of 20 identified archaeological high probability areas (HPAs). If the mitigation measures discussed in Section 3.21.6 are implemented, the impacts to cultural resources could be reduced to less than significant levels.

3.21.4.2 Alternative 1: HCT/TDM Emphasis

This alternative is expected to affect considerably fewer recorded properties than Alternatives 2, 3, and 4 and the Preferred Alternative, and it would have the lowest potential effect on properties over 50 years of age of the action alternatives. This alternative could encroach on 13 of 20 identified archaeological HPAs. If the mitigation measures discussed below are implemented, the impacts to cultural resources could be reduced to less than significant levels.

3.21.4.3 Alternative 2: Mixed Mode with HCT/Transit Emphasis

This alternative is expected to affect the second highest number of recorded properties, and has the fourth highest number of properties over 50 years of age that potentially would be affected. Two of the three previously recorded archaeological sites could be affected by projects in this alternative. This alternative could encroach on 18 of 20 identified HPAs. If the mitigation measures discussed below are implemented, the impacts to cultural resources could be reduced to less than significant levels.

3.21.4.4 Alternative 3: Mixed Mode Emphasis

This alternative is expected to affect the highest number of recorded historic sites, and has the second highest number of properties over 50 years of age that potentially would be affected. All three previously recorded archaeological sites could be affected by projects in this alternative. This alternative could encroach on 18 of 20 identified HPAs. If the mitigation measures discussed below are implemented, the impacts to cultural resources could be reduced to less than significant levels.

3.21.4.5 Alternative 4: General Capacity Emphasis

This alternative is expected to affect one fewer recorded historic site than Alternative 2, but has the third highest number of properties over 50 years of age that potentially would be affected.

All three previously recorded archaeological sites could be affected by this alternative. This alternative could encroach on 17 of 20 identified HPAs. If the mitigation measures discussed below are implemented, the impacts to cultural resources could be reduced to less than significant levels.

3.21.4.6 Preferred Alternative

The Preferred Alternative is expected to affect the same number of recorded historic sites as Alternative 3, and it has the highest number of properties over the age of 50 years that potentially would be affected. All three previously recorded archaeological sites could be affected by projects in this alternative. This alternative could encroach on 18 of 20 identified HPAs. If the mitigation measures discussed below are implemented, the impacts to cultural resources could be reduced to less than significant levels.

3.21.5 Mitigation Measures

Mitigation measures that can be applied to reduce the impacts of the alternatives on cultural resources are discussed in this section. Actual mitigation measures that will be implemented (either prior to or during construction and/or operation of the various alternatives and/or their individual elements) will be determined as appropriate, consistent with the kind of cultural resource affected (archaeological site, historic building, etc.) and the magnitude of the actual impact to the resource (removal/relocation of historic building, trenching through an archaeological site, etc.).

The purpose of mitigation measures, with respect to cultural resources, is to reduce harm caused by the construction and/or operation of alternatives. At this programmatic level of analysis, potential mitigation measures are identified that might contribute to meeting federal, state, and local regulations. If the mitigation measures identified here are implemented, then the potential impacts associated with the projects could be substantially reduced.

Only historic properties that are listed in, or are determined to be eligible for listing in, the NRHP (or the WRHP) would be subject to mitigation measures required by the SHPO. On the local level, individual cities and/or counties with discretionary (SEPA or other) project review authority, might also require implementation of appropriate mitigation measures to reduce harmful project effects on historic properties important only on the local level.

Since many of the historic properties identified through background research have not been evaluated, it is not possible to determine how many historic properties would ultimately qualify for mitigation measures (in the event alternatives would adversely affect them). For example, Table 3.21-3 lists numbers of pre-1960 buildings/structures within the estimated footprints of the various alternatives. Until actually investigated as part of a project-level environmental analysis, documentation, and review, the actual number of federal, state or locally eligible historic properties that might require mitigation cannot be determined.

3.21.5.1 General Mitigation Measures

Archaeological Resources

General mitigation measures for archaeological resources may include archaeological monitoring, subsurface testing, and data recovery. Archaeological monitoring may be warranted for areas where construction is scheduled in areas of high probability for containing

archaeological sites (but which exhibit no outward indications that such sites are actually present). Archaeological monitoring may also be warranted where pre-construction subsurface testing is not feasible.

Subsurface testing (e.g., "presence/absence" testing) may be warranted for areas that have a high probability for containing archaeological deposits, but that exhibit no outward indications of such deposits and where subsurface testing is feasible. Archaeological sites that are determined to be of sufficient importance to be eligible for listing in the NRHP might be subject to "data recovery" requirements (controlled archaeological excavations subject to SHPO review) if project-related impacts cannot be avoided. Archaeological sites determined to be ineligible for NRHP listing, through formal subsurface testing, are most often not subject to data recovery requirements.

Historic Buildings and Structures

General mitigation measures for anticipated impacts on historic resources include, but are not limited to:

- Designing the project to avoid or limit physical alteration, visual, atmospheric, or long-term noise impacts;
- Relocating historic resources to appropriate new sites; and/or
- Modifying construction methods to avoid or limit construction-related impacts.

Once project design development begins, a review process to refine specific project elements can be undertaken in order to minimize visual and other impacts on historic resources and improve design compatibility with the historic setting and character of individual resources and historic districts. This review process includes:

- Consult with the State Historic Preservation Officer on project design elements that may damage, alter, or obscure views of an NRHP listed or eligible historic resource,
- Obtain review and approval by the city historic preservation officer, King or Snohomish county historic preservation agencies, or other appropriate local review boards, for project design elements that may damage, alter, or obscure views of a designated local landmark or special review district.

Where operational noise and vibration impacts on historic resources are identified, potential mitigation measures, including noise walls, may be effective or appropriate if there are no harmful associated visual impacts. Consideration also will be given to other sound-reduction approaches such as landscape buffers.

When impacts cannot be adequately and practicably avoided, and it is necessary to acquire and remove a historic resource, in some cases the resource may be moved to another site or, less frequently, the resource may be demolished. The relocation or demolition of a historic resource requires complete review and approval by the SHPO and/or county or city landmark preservation board (or similar authority) and must meet established standards for documentation, site selection, and relocation methods.

Where construction-related impacts may include physical damage to a building, the introduction of short-term audible, visual, and atmospheric elements that are out of character with the historic resource, or the obstruction of access to the property, the modification of construction methods to

avoid or limit these impacts will be examined. Mitigation measures to minimize construction-related impacts include, but are not limited to:

- Using rigid support of excavation structures (shoring) to minimize movement of the ground;
- Underpinning the building prior to excavation;
- Stabilizing the ground through cementitious or chemical grouts, freezing the ground, or other techniques;
- Protecting facades of nearby historic buildings from the accumulation of excessive dirt or cleaning in an appropriate manner at the conclusion of construction;
- Maintaining access to historic properties, except for unavoidable short periods, during construction;
- Locating temporary construction sheds, barricades, and material storage areas so as to avoid obscuring views of historic properties; and/or
- Complying with local noise restrictions for construction and equipment operation.

In those cases where historic buildings and structures are subject to adverse effects (including removal or demolition) mitigation will include such measures as recording the contributing buildings, structures, and other features associated with the endangered historic property in accordance with the standards of the Washington SHPO and local consulting parties regarding both requirements and repository, as appropriate. Finished documentation packages would be provided to the Washington SHPO and local consulting parties.

Appropriate mitigation will be developed in consultation with SHPO and interested local parties during environmental analysis, documentation and review for individual projects.

Ethnographic/Native American Cultural Resources

At this programmatic level of analysis, it is difficult to ascertain if any ethnographic/Native American cultural resources (or "Traditional Cultural Properties") would be affected by the alternatives or by specific project elements that make up the alternatives. During future project-level environmental analysis, documentation, and review, the presence/absence of tribal cultural resources will be determined in consultation with local Indian tribes. Government-to-government consultations between WSDOT, FHWA and the local Indian tribes have not yet resulted in an inventory of tribal cultural resources in the project area. However, WSDOT has initiated a cultural resources study for urban corridor projects, including the I-405 Corridor Program, and will further identify tribal cultural resources and mitigation measures.

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